

REPUBLIC OF MOLDOVA

**TRANSMISSION PRICING
METHODOLOGY**

**Regulatory Development
and
Power Market Operations**

**Moldova Energy Sector Reform
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TRANSMISSION PRICING METHODOLOGY

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1. INTRODUCTION

Transmission pricing cannot be considered in isolation from other aspects of the regulatory and market arrangements governing the Moldova power system, including: the manner in which overall network revenue is determined, the wholesale market rules, and the provisions for network expansion. Also we must take into consideration the various elements affecting the restructuring of the power sector:

- Restructuring to separate the monopoly network elements from generation;
- Arrangements for third-party access to the network;
- Introduction of a competitive wholesale market;
- Privatisation.

1.1. Capacity Expansion

Two polar models for network expansion are central planning and user-driven expansions. In both cases, the incentives for making efficient investments will depend on the arrangements for investors to recoup their investments, with an appropriate return. The rules governing network planning and expansion have important implications for efficient network pricing.

1.2. Suggested Principles for Ratemaking.

Transmission tariffs should reflect the following principles:

- Reflect cost-of-service analyses;
- Result from a process centered on transparent/verifiable costs;
- Avoid undue complexity; and
- Provide proper price signals to users of the transmission network.

Monopoly services should not be priced arbitrarily. Tariffs should reflect the utility's costs to provide service based on verifiable costs and a predictable, transparent regulatory process.

The values used to determine the cost of service should be based on the utility's accounting records and audited by an independent accounting firm. Utilities use various time periods to measure annual revenue requirements to provide the service such as historical test period, current year or pro-forma year.

Costs normally included in such revenue requirements should be supported in enough detail to show these costs are necessary in performing the service. Any calculation of costs should be consistent with generally accepted accounting procedures.

Rates should be simple in structure so that buyers of the service can determine what will be the change in billing to them of increasing or decreasing the level of service provided. The marginal price for service should reflect the marginal change in costs of providing such service.

2. TRANSMISSION SERVICE COMPONENTS

2.1. Administration Services

2.1.1. Analyze And Arrange Requested Service

Transmission customers request transmission services as required to deliver various primary and ancillary generating services. Transmission owners are not always responsible for determining the availability of transmission capability and arranging the transactions. In any case, the costs of providing these services should be identified and allocated to the customers requiring such service.

2.1.2. Bill For Services And Collect Revenue

Similar to section above, one of the power sector entities will need to develop invoices and collect and distribute funds as a result of such invoices. Again the cost of this service can be identified and allocated to the customers requiring such service.

2.2. Provision of Capability

2.2.1. Provide/Reserve Transmission Capability

This is the primary service provided by the transmission function. The rates for this service include the costs of transmission facilities, operations and maintenance expenses, and certain administration and general expenses not included in other specific services.

2.2.2. Provide Additional Facilities, If And When Necessary

The provision of new transmission facilities includes: the costs of planning, designing, engineering, constructing, and placing into service the new facilities. Many issues may be associated with the expansion of transmission capability which need to be resolved by Regulators, including: who determines which facilities should be built, who can build new facilities and who should pay for these new facilities.

2.3. Delivery Services

Delivery or ancillary services can be provided by various entities within the electric power sector. The purpose of these services can be regarded as generation or transmission related services or as separate system operations services.

2.3.1 Control Power Flow And Frequency

These services relate to the equipment and operations needed to stabilize the power system. The facilities can include automatic generator control and dispatch facilities. This service includes forecasting, scheduling, and committing generating and transmission resources to meet the customer load.

2.3.2 Provide Adequate Reactive Supply And Voltage Control

This service can be provided by several different utility entities. Generators can provide or receive reactive power by changing the power factor output of the generating unit. Transmission owners can provide reactive power by installing capacitors and reactors in key locations. Sometimes the distribution companies place capacitors and reactors in their substations to support voltage on nearby transmission facilities.

The costs of service which provide voltage support on the transmission system should be borne by the users of the transmission system. Other reactive power services may be needed for voltage support of the sub-transmission and distribution systems or at individual customer's premises are a separate matter.

2.3.3 Keep System Secure And Available

There are several services within this category. These services include the provision of operating reserves, protection equipment, load shedding, back-up services, and black start of generation.

2.4. Monitoring And Metering Services

The magnitude of services relating to accounting of power deliveries can be small or very large depending upon the structure of power supply markets and energy balancing requirements. A market that is open to thousands of customers will require a sophisticated metering, hardware, and software system. These services are critical to the functioning of a power market, where energy transactions, including responsibilities for transmission use, must be accounted for on at least an hourly basis. In addition, market rules, that penalise resource suppliers for over-supplying or under-supplying energy in each hour as compared to the customers they serve (energy balancing), makes the monitoring services very important.

3. TRANSMISSION SERVICES COSTS

3.1 Cost Components

The costs of transmission include both capital and operating cost components. These include the capital costs of all power system facilities that are used to provide the transmission function. Some of these elements are entirely dedicated to transmission, such as transmission lines and towers and transmission substations. Other elements are only partially attributable to transmission, and the appropriate fractions of these costs can be difficult to determine. For example, a portion of the cost of most generation stations may be attributed to the provision of reactive power for the express purpose of supporting transmission voltage.

Transmission operating costs include both fixed and variable components. Of these, fixed operation and maintenance costs are the largest component. A significant fraction of these costs are due to the labor required to operate and maintain transmission facilities, which is not

dependent upon utilization of the facilities. Other operating costs vary with transmission use and load. For example, the cost of capacity and energy losses on the transmission system vary with the use of specific lines and transformers. Energy losses also vary with the cost of the fuels that are used to replace the losses.

Some transmission costs are a direct result of system operating constraints. For example, when the use of a system is constrained due to a particular operating limit, opportunity costs associated with the inability to consummate a particular transaction may be incurred by specific market participants. Such costs are difficult to document because they depend upon being able to establish what would have happened had the constraint not limited operations. Opportunity costs are typically bounded on the high side by the costs associated with removing these constraints.

3.2 Cost Verifiability

Costs are verifiable when any party can establish that the costs were incurred and determine the amounts of these costs. To verify a transmission service cost, one must be able to obtain reliable data showing that the specific facility or operating cost was associated with the service being provided and then to verify the basic data used to establish the capital and operating cost of that facility. Some transmission costs that must be verified include the transmission utility's operating costs and its capital costs of the plant, as carried on the owner's book of accounts. Also included are the costs of the transmission losses incurred in operating the system. Some of the more challenging transmission costs to determine, which may not be subject to direct verification, include those associated with providing transmission reservation services and those associated with transmission system expansion.

Generation facilities can also provide benefits to the transmission system and, when such services are provided, associated costs must be verified. One obvious example is that associated with reactive power production in power plant generators and exciters. These costs must be verified by a cost allocation process that provides for desegregating generating unit costs into those components that are dedicated to the provision of real power (megawatts) and those which are dedicated to the provision of reactive power (VARs), to the extent possible. Some components will contribute to multiple functions, making this task complex.

Distribution system components also may support certain transmission services. Where this is the case, it is important to be able to determine and calculate the cost of these devices and to separate them from those costs that are strictly associated with the distribution function.

4. INTERIM TRANSMISSION PRICING

4.1 Introduction

Properly designed high voltage transmission service pricing for the wheeling of electric power should provide for tariffs which promote the economic use of the entire transmission system network in the Moldova Control Area. The tariff arrangements also should be designed to

operate in harmony with system reliability objectives, while avoiding any barriers to competition in the market to the benefit of the ultimate users of electric power.

A truly competitive wholesale power market cannot exist if transmission owners are allowed to use the monopoly power inherent in their ownership and operation of essential facilities to arbitrarily control market access to potential competing users. A realistic, practical pricing methodology for both system access and use is essential to create an efficient, economical and competitive bulk power market.

4.2 Objectives Of Properly Designed Transmission Service Pricing

Ideally, the transmission tariff policy and methodology should satisfy the following objectives:

- a) Ensure revenues adequate to compensate for the costs of operation and maintenance of the transmission system;
- b) Encourage the efficient use and development of the network, both in the short and long term;
- c) Ensure equitable treatment of, and non-discrimination among, market participants who use the transmission system;
- d) Establish a price structure which is economically sound, simple enough for users to understand and transparent to administer;
- e) Provide pricing stability over time;
- f) Provide flexibility to adapt to changing circumstances in the short and long term; and
- g) Accommodate embedded generators and private generation stations.

4.3 Recommended Transmission Service Pricing

For the current state of evolution of the Moldova power system, the most suitable methodology to accomplish the multiple objectives outlined above is to apply the method known as a “cost based postage stamp rate”. This concept would implement a single price applicable to energy transmitted across the transmission grid from the generating units or import delivery points to the load centers within the Control Area and power deliveries into the Control Area.

This high voltage transmission service rate would be derived by dividing the annual cost of operating and maintaining the transmission network facilities (110 kV and higher) that are actually performing wheeling by the aggregate amount of energy flowing within the Control Area during an historic or projected time period.

The resulting rate would be approved by ANRE in accordance with the license for transmission services held by Moldtranselectro. In determining the appropriate level of allowed transmission tariffs, ANRE would rely not only on historic performance, but also take into consideration measures to encourage efficiency improvements, such as the use of “price or revenue caps”, performance benchmarking or other mechanisms.

Power wheeling required to accommodate bilateral point-to-point contracts in-and-out of (transit through) the Control Area, and from the control Area to the systems outside Moldova would be priced at the same rate, but converted as necessary to fixed monthly, weekly, or hourly rates, depending on the length of the transaction. These rates would be applied to the highest hourly kW value of a particular transmission transaction.

The main advantage of this methodology is that the use of a single, cost based wheeling rate, with payments based on transmitted load, facilitates and simplifies administration of the tariff.

Wheeling service under this approach is automatically available and charged to all entities who purchase energy within the control area. Power traders within the Control Area would analyse potential power transactions solely on the basis of production cost economics and marketing needs.

The wheeling tariff developed under this methodology would be non-discriminatory, fair and transparent. It would provide good foundation for the future development of the truly competitive wholesale power market without undue influence of transmission service providers.

At the same time proceeds from the transmission fund should adequately cover operating and maintenance costs of the transmission network facilities. The revenues received from the payments for wheeling services for transactions through the Control Area, and from the Control Area to the outside of the Control Area would be used to offset the cost of operating and maintenance of transmission network facilities, which in turn would help to lower transmission costs borne by consumers in Moldova.